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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,459	05/11/2005	Hiroshi Kurakata	4918-0102PUS1	6940
2292 7590 03/24/2010 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER				
EOFF, ANCA				
ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

**Office Action Summary****Application No.**

10/534,459

**Applicant(s)**

KURAKATA, HIROSHI

**Examiner**

ANCA EOFF

**Art Unit**

1795

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01/11/2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 3, 5, 6, 8-10, 12 and 14-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10, 12, 14, 15 and 20-23 is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5, 6, 8, 9, 16-19 and 24 is/are rejected.
- 7) ☒ Claim(s) 25 and 26 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Claims 1, 3, 5, 6, 8-10, 12 and 14-26 are pending. Claims 2, 4, 7, 11 and 13 have been cancelled.
2. The foreign priority documents JP 2002-347224, filed on November 29, 2002 was received and acknowledged. However, in order to benefit of the earlier filing date, a certified English translation is required.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –  
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 8-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Suwa et al. (US Patent 6,692,887), as evidenced by Watanabe et al. (US Pg-Pub 2002/0150825).

Claim 8 is a product-by-process claim. While the claim is directed to a process, the patentability is determined by the product itself.

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (MPEP 2113)

With regard to claims 8-9, Suwa et al. teach a radiation sensitive composition excellent in transparency with respect to radiation (abstract). The radiation sensitive composition forms patterns on substrates ( column 24, line 42-column 25, line 55).

The radiation sensitive composition may comprise a hydrogenated alicyclic olefin resin with carboxyl group (see resin AIII-2 in column 29, line 45-column 30, line 15 and resin AIII-3 in column 31, lines 35-50).

It is known in the art that a carboxyl group leads to intramolecular hydrogen bonding to form a crosslinked structure, as evidenced by Watanabe et al. in par.0127.

Therefore the carboxyl groups in the resin of Suwa et al. lead to a crosslinked hydrogenated alicyclic olefin resin.

Therefore, the pattern film of Suwa et al. is identical or in the alternative renders obvious the pattern film of the instant application.

Suwa et al. further teach that the radiation sensitive composition is used for the production of semiconductor devices (column 2, lines 45-51).

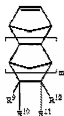
### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3, 5-6, 16 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al. (US Patent 6,451,499) in view of Imai et al. (US Pg-Pub 2002/0012880) or Aoai et al. (US Patent 6,245,485).

With regard to claims 1, 3 and 24, Jayaraman et al. disclose a polymer used for negative and positive photoresist compositions (abstract), wherein the polymer may comprise units of monomers of formulas (I) and (II) (column 3, lines 21-23):



(I) (monomer of formula (III) in column 8, lines 55-65),



(II) (monomer of formula (I) in column 3, lines 30-40).

For the monomer of formula (I) above, m is preferably 0 or 1 (column 9, lines 8-9) and R<sup>9</sup> to R<sup>12</sup> comprise groups ending in -C(O)OR" (column 8, line 66-column 9, line 7), wherein R" may be a hydrogen atom (column 10, lines 20-21).

The monomer of formula (I), which comprises groups -C(O)OR", wherein R" is a hydrogen atom is equivalent to the alicyclic olefin monomer with an acidic group of claims 1 and 3 of the instant application.

Jayaraman et al. further teach that a way to polymerize the monomers of the instant application is by ring-opening metathesis polymerization (ROMP) followed by hydrogenation (column 11, lines 20-23).

A polymer derived from the monomer of formula (I), is equivalent to the alicyclic resin which is a ring-opening polymer having a carboxyl acidic group of the instant application. A polymer derived from the monomer (I) also meets the limitations of claim 3 of the instant application.

The limitation that the alicyclic resin "is obtained by ring-opening polymerization of a polymerizable monomer comprising an alicyclic olefin monomer having an acidic group in a presence of a catalyst comprising ruthenium, followed by hydrogenating an obtained polymer, wherein the catalyst comprising ruthenium is a catalyst comprising as main component an organoruthenium compound in which a neutral electron-donating ligand is co-ordinated" is a product-by-process limitation.

While the claim is directed to the process of obtaining the alicyclic resin, the patentability is determined by the alicyclic resin itself. The resin of Jayaraman et al. is a ring-opening polymerization alicyclic resin with an acidic group which is identical or, in the alternative, renders obvious the resin (A) of the instant application.

Jayaraman et al. teach that polymers derived from the monomers (I) may be included in positive resists (column 17, lines 65-66) but fail to teach all the components of the positive resist of the instant application.

However, it is known in the art that a polymer with pendant carboxyl groups may be comprised in a positive resist, in combination with a crosslinker and an acid generator, as shown by Imai and Aoai.

Imai et al. disclose a positive sensitive resin composition comprising a base polymer with carboxyl groups, an ether bond-containing unsaturated compound and an acid-generating agent (abstract, par.0019-0020). The ether-bond containing olefinic unsaturated compound of Imai et al. acts as a crosslinker (see par.0133)

Aoai et al. teach a positive resist composition comprising a compound generating an acid, a resin with a carboxyl group and a compound with at least two vinyl groups (column 3, line 63 - column 4, line 8), wherein the compound with two vinyl groups act as a crosslinker (column 8, lines 42-46).

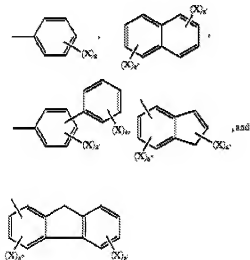
Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the polymer with carboxyl groups of Jayaraman et al. in the positive resist composition, in combination with a acid-generating compound and a crosslinker, as shown by Imai and Aoai, with a reasonable expectation of success.

Jayaraman et al. further teach that a positive resist may comprise a solvent (column 20, lines 8-10).

Jayaraman et al. further disclose that the positive sensitive resin composition forms a pattern on a substrate (column 19, lines 65-column 20, line 3), which is equivalent to the resin film of a positive pattern of claim 24 of the instant application.

Therefore, the pattern of Jayaraman modified by Imai or Aoi is equivalent to the resin film of a positive pattern of claim 24 of the instant application.

With regard to claim 6, for the monomer of formula (II) at least one of  $R^1$  to  $R^4$  comprises a group selected from:



In such a case, the monomer of formula (I) is equivalent to the alicyclic olefin monomer of claim 6 in which a group having an aromatic group and an ether group (aprotic polar group) are bonded.



With regard to claim 16, Imai et al. teach that the positive resist may comprise an acid generator such as a naphthoquinone diazide sulfonate (par.0097) which is equivalent to the quinone diazide sulfonic acid ester capable of forming a positive pattern of the instant application (see page 22, lines 12-13 of the specification).

7. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al. (US Patent 6,451,499) in view of Imai et al. (US Pg-Pub 2002/0012880) and Aoai et al. (US Patent 6,245,485) as applied to claim 16 and in further view of Suwa et al. (US Patent 6,692,887).

With regard to claims 17-19, Jayaraman modified by Imai and Aoai teach the resist composition of claim 16 (see paragraph 6 above), wherein the photoacid generator may be a naphthoquinone diazide sulfonate (see Imai et al., par.0097).

However, Jayaraman, Imai and Aoai fail to teach the acid-generating agent of the instant application.

Suwa et al. disclose a radiation-sensitive resin compositions comprising a resin with an alicyclic skeleton in the backbone (abstract). The radiation-sensitive resin may comprise a photoacid generating agent, such 1,2-naphthoquinonedizide-5-sulfonic acid ester of 2,3,4,4'-tetrahydroxybenzophenone (column 20, lines 4-5).

As Suwa et al. shows that that the 1,2-naphthoquinonedizide-5-sulfonic acid ester of 2,3,4,4'-tetrahydrobenzophenone is used as photoacid generating compound in radiation sensitive composition, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the 1,2-naphthoquinonedizide-5-sulfonic acid ester

of 2,3,4,4'-tetrahydrobenzophenone of Suwa et al. in the resist composition of Jayaraman modified by Imai, with a reasonable expectation of success.

The 1,2-naphthoquinonedizide-5-sulfonic acid ester of 2,3,4,4'-tetrahydrobenzophenone is equivalent to the quinonediazidesulfonic acid ester obtained from ,2-naphthoquinonedizide-5-sulfonic acid chloride and 2,3,4,4'-tetrahydroxybenzophenone of the instant application.

***Allowable Subject Matter***

8. Claims 25-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Imai et al. (US Pg-Pub 2002/0012880) and Aoai et al. (US Patent 6,245,485) fail to teach the crosslinking agents of claim 25.

Jayaraman et al. fail to teach the alicyclic monomers of claim 26.

9. Claims 10-12, 14, 15 and 20-23 are allowed.

Jayaraman et al. (US Patent 6,451,499) do not teach the process of claim 10 of the instant application.

There is no prior art teaching that would motivate one of ordinary skill in the art at the time of the invention to modify the teachings of Jayaraman and obtain the process of claim 10.

***Response to Arguments***

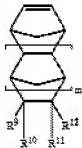
10. With regard to the applicant's arguments, see pages 13-14 of the Remarks filed on January 11, 2010, the examiner would like to point out that the rejection of claims 8-9 under 35 USC 102(e)/103(a) over Akaiwa et al. (US Patent 5,721,990) is withdrawn following the applicant's amendment to claim 8.

11. Applicant's arguments filed on January 11, 2010 with regard to the rejection of claims 1-3, 5-6, 16 and 24 under 35 USC 103(a) over Jayaraman et al. (US Patent 6,451,499) in view of Imai et al. (US Pg-Pub 2002/001288) have been fully considered but they are not persuasive.

On pages 15-16, the applicant argues that the process limitations in the inventive product-by-process claims should be given patentable weight, since the process limitations necessarily result in a product which is *structurally distinct* from the product of Jayaraman et al.

The examiner disagrees and would like to show that the resins of Jayaraman et al. are not structurally distinct from the resins (A) of the instant application.

The resins of Jayaraman et al. may be derived by polymerizing different monomers, including the monomer (III):



(monomer III in column 8, lines 55-65), wherein  $R^9$ - $R^{12}$  may be a polar group with a  $-C(O)OR''$  end group (column 8, line 67- column 9, line 7), wherein  $R''$  may be a hydrogen atom (column 10, lines 20-21). This monomer is equivalent to the monomer (1) of the instant application, as shown on page 8 of the specification.

Also, Jayaraman et al. teach that the polymerization may include ring-opening metathesis polymerization (ROMP) followed by hydrogenation (column 11, lines 20-23).

A polymer derived from the monomer (III), which undergoes ring-opening-polymerization and hydrogenation is equivalent to the resin (A) of the instant application. There is *no structural difference* between the resins of Jayaraman and the resin (A) of the instant application.

On pages 16-17, the applicant argues that Jayaraman et al. teach that is preferable to protect the hydroxyl moiety during the polymerization reaction (column 14, lines 31-40 of Jayaraman et al. )

The examiner agrees that Jayaraman et al. teaches that the  $-OH$  group (in alcohol, carboxyl, phenolic moieties) should be protected during polymerization.

However, Jayaraman et al. teach that the protected hydroxyl moiety is then deprotected to yield the alcohol, carboxylic acid or phenol containing functionality (column 14, line 65-column 15, line 2). Therefore, at the end of the process, the

polymer/resin of Jayaraman et al. contains the unprotected hydroxyl group of the carboxyl moiety same as the resin (A) of the instant application.

While the process of making the resin (A) of the instant application and the process of making the polymers of Jayaraman et al. are different, the end products (resin/polymer) are equivalent.

On pages 17-18 of the Remarks, the applicant argues that the resin films formed by resins produced by ring-opening polymerization, hydrogenation and hydrolysis of ester groups have poor storage stability. However, there is no evidence in support to this argument. The Examples of the instance application do not show the poor storage stability of films comprising resins obtained by ring-opening polymerization, hydrogenation and hydrolysis in comparison to films comprising the resins of the instant application.

On pages 18-19 of the Remarks, the applicant argues that the ruthenium catalyst is effective as polymerization catalyst and hydrogenation catalyst.

However, the examiner would like to show that claims 1 and 24 are not directed to the method of polymerization, but to the resin (A). The process of making the resin does not give any patentable weight to the resin (A) in claims 1 and 24.

On pages 19-20 of the Remarks, the applicant argues that crosslinked structure formed by the crosslinking agent of the instant application is not cleaved by irradiation with an active energy beam but it is maintained after irradiation and development so that the resin pattern may be cured by heating (post-baking). The crosslinker of Imai et al.

forms a crosslinked structure which is cleaved by irradiation and cannot be used as the crosslinker of the instant application.

The examiner would like to point out the fact that claims 1 and 24 are not directed to the method of making a pattern. Claims 1 and 24 are not concerned with the way the crosslinker operates during the pattern formation.

Claims 1 and 24 only recite a crosslinking agent (C) which is a compound capable of forming a crosslinked structure between molecules of the crosslinking agent by heating.

The specification of the instant application teaches that such crosslinking agent (C) may be a compound having two or more reactive groups, wherein the reactive groups may be vinyl groups (page 23, lines 11-14).

Therefore, the ether-bond-containing olefinic unsaturated compounds of Imai comprise preferably 2-4 vinyl groups (par.0089) so they are equivalent to the crosslinking agents (C) of the instant application.

The applicant further argues that Imai et al. fail to teach the resin (A) of the instant application.

The examiner agrees that Imai et al. do not teach the resin (A) of the instant application. However, Imai et al. show that a resin with pendant phenolic and carboxylic groups may be used in a positive resist in combination with an acid-generating agent and a crosslinker.

Therefore, Imai et al. provides the motivation to one of ordinary skill in the art to use the resin with carboxylic acid groups of Jayaraman et al. in a positive resist in combination with an acid-generating agent and a crosslinker.

### ***Conclusion***

12. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANCA EOFF whose telephone number is (571)272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. E./  
Examiner, Art Unit 1795

/Cynthia H Kelly/  
Supervisory Patent Examiner, Art Unit 1795